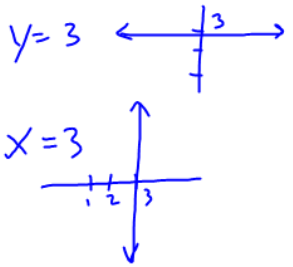
Sect. 1.1

- Slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$
- Diff. forms of linear equations p. 8
- parallel & perpendicular lines p. 9



parallel: same slope

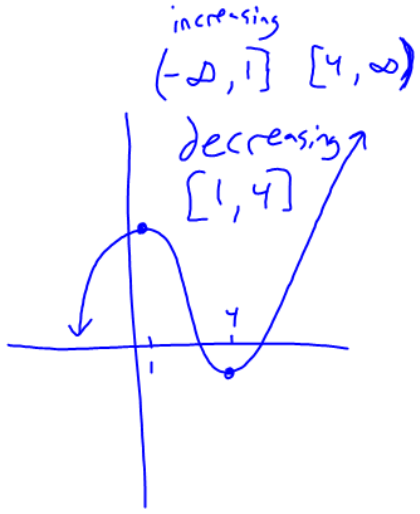
perpendicular: $\frac{3}{4} \rightarrow -\frac{4}{3}$, $-2 \rightarrow \frac{1}{2}$

Sect. 1.2

- Functions
  - definition: every x-value has only 1 y-value
  - Notation: $f(x)$, $f(2)$
- Domain & Range, independent & dependent p. 16, 18, 20
- Difference Quotient
- Summary of terms p. 23

Sect. 1.3

- graphs of functions defined p. 30
- vert. line test p. 31
- Increasing & decreasing p. 32
- relative min and max. p. 33
- even & odd function p. 36
- Greatest Integer function p. 35
- piecewise function p. 35



Even function

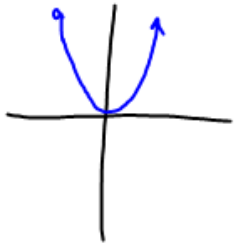
$f(-x) = f(x)$

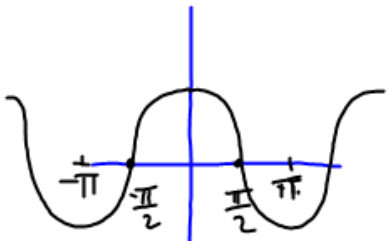
Symmetrical over y-axis

$f(x) = x^2$

$f(-2) = 4$

$f(2) = 4$ > even





odd function

$f(-x) = -f(x)$

Symmetrical across origin

double flip over x-axis then y-axis

$f(x) = x^3$

$f(-2) = -8$

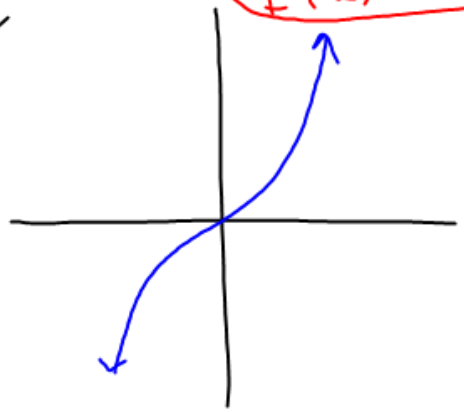
$f(2) = 8$

$f(x) = x^3 + 2$

$f(-2) = -6$

$f(2) = 10$

neither



Greatest Integer - Biggest integer less than or equal to x

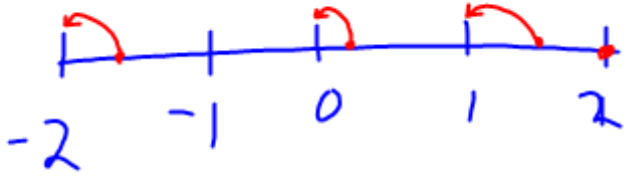
$f(x) = [[x]]$

$[[1.5]] = 1$

$[[0.1]] = 0$

$[[2]] = 2$

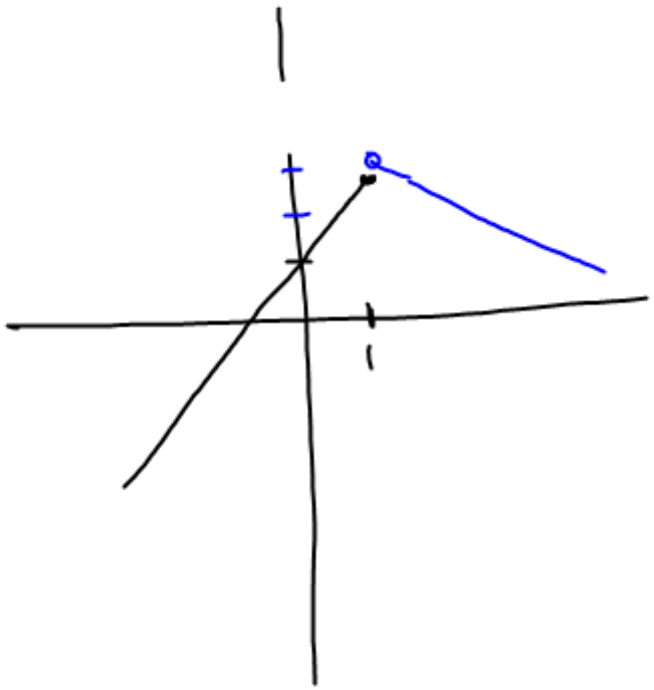
$[[-1.6]] = -2$



Math → NUM → int(

Piecewise

$$f(x) = \begin{cases} 2x+1, & x \le 1 \\ -x+4, & x > 1 \end{cases}$$



On Calc

$y_1 = (2x+1) / (x \le 1)$

$y_2 = (-x+4) / (x > 1)$

2nd math

Domain / Range

Ex. $f(x) = \sqrt{6-x}$

$\sqrt{\text{neg}}$

$6 - x = 0$

$x = 6$ (boundry pt.)

+ | −

6

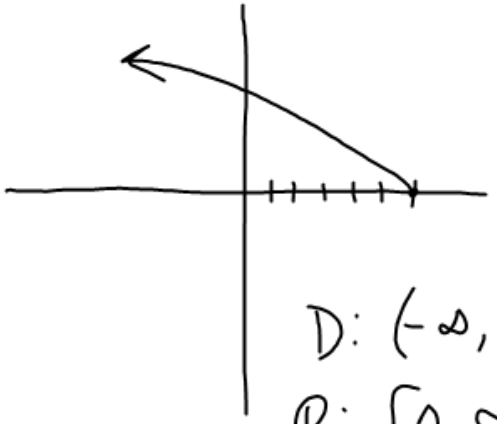
D: $(-\infty, 6]$

R: $f(6) = \sqrt{6-6} = 0$

$f(0) = \sqrt{6}$

$f(100) = \sqrt{-94}$ bigger bigger

$[0, \infty)$



D: $(-\infty, 6]$

R: $[0, \infty)$

Find Domain and Range - Solve analytically

Used / incld. open interval / not incld.

(a) $y = \sqrt{4x-5}$

$4x - 5 = 0$

$4x = 5$

$x = \frac{5}{4}$

$\frac{-}{\frac{5}{4}} \quad \frac{+}{}$

D: $\left[\frac{5}{4}, \infty\right)$

$x \geq \frac{5}{4}$

R: $[0, \infty)$

(b) $y = \frac{3}{4x-6}$

$4x - 6 = 0$

$x = 1.5$

D: All $\mathbb{R}$, $x \neq 1.5$

R: $(-\infty, \infty)$, $y \neq 0$

(c) $y = \frac{5}{\sqrt{x-8}}$

D: $(8, \infty)$

$x > 8$

R: $(0, \infty)$

$y > 0$

&

D: $(8, \infty)$

R:

I drove to Santa Fe, 350 miles away.

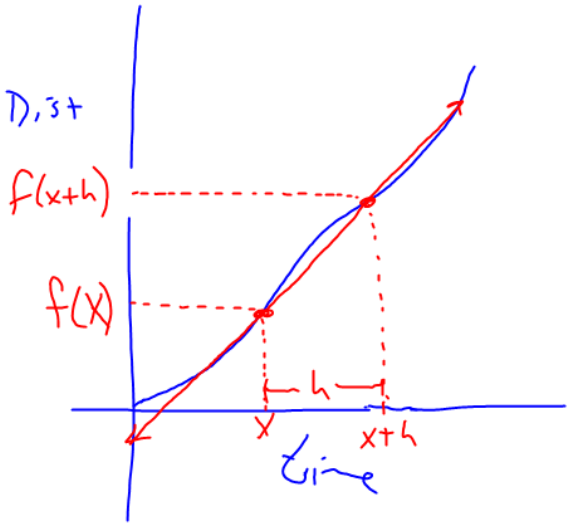
I left at 8:00am and arrived at 3:00pm.

About how fast was I going at 10:00am?

$$50 \text{ mph} = \frac{350 \text{ m}}{7 \text{ hrs}} \Rightarrow$$

9:00 – 11:00 120 miles, 60 mph.

9:30 – 10:30 65 miles, 65 miles/hr.



$$m = \frac{y - y_1}{x - x_1}$$

$$m = \frac{f(x+h) - f(x)}{(x+h) - x}$$

$$\boxed{m = \frac{f(x+h) - f(x)}{h}}$$

$f(x) = 2x^2 + 3$

$$m = \frac{2(x+h)^2 + 3 - (2x^2 + 3)}{h}$$

$(x+h)(x+h)$

$x^2 + 2xh + h^2$

$$= \frac{2(x^2 + 2xh + h^2) + 3 - 2x^2 - 3}{h}$$

$$= \frac{2x^2 + 4xh + 2h^2 + 3 - 2x^2 - 3}{h}$$

$$= \frac{4xh + 2h^2}{h} = 4x + 2h$$

Homework

p. 29 #83-86

p. 83 #47, 48

p. 23 Help